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THE GENUS *LACTUCA* IN IOWA.

R. I. CRATTY.

The present paper on the genus *Lactuca* and its distribution in Iowa is the result of a study of this group of plants carried on at the Iowa State College during the past two years, supplemented by field work, and a visit to some of the other large herbaria in the state. The extensive collection of this genus in the State College herbarium, very largely the result of Doctor Pammel's work, has been freely used. To Dr. B. Shimek the author is indebted for the privilege of examining the *Lactuca* in the herbarium of the State University, and to Prof. T. J. Fitzpatrick, of the State University of Nebraska, for access to his fine herbarium near Iowa City, which contains an especially rich and valuable collection of Iowa plants. The Hon. O. M. Oleson, of Fort Dodge, kindly loaned some specimens for examination. Mr. C. Neuberth, of the Field Columbian Museum, Chicago, also granted access to the *Lactuca* in that institution. To all these gentlemen grateful thanks are extended. For the drawings of the akenes in the plate accompanying this paper the writer is indebted to Miss Charlotte M. King, of the Iowa State College, whose skillful hand has done so much to illustrate the numerous publications issued by this institution.

Some of the species of *Lactuca* are very puzzling, especially when only leaves and flowers are present, on account of the great variation in the color of the flowers, and the greater diversity of leaf forms in several species. The mature fruit should be secured if possible, as it is a great help in determination.

The genus *Lactuca* is represented in our state flora by eight species, six of which are native. It belongs to the subfamily *Cichoriaceae* of the great family *Compositae*. The genus *Mulgedium* is considered distinct by Engler and Prantl in *Die Naturlischen Pflanzenfamilien*, and by DeCandolle in the *Prodromus*, but by Bentham and Hooker it is reduced to a section of *Lactuca* and in this they are followed by most American botanists.

There is a great diversity of opinion among our systematists regarding the disposition of the Linnaean species *L. virosa* and *L. scariola*. The oldest described species of this group is *L. virosa* and

the majority of authors now accept it as the true name for what by many American bontanists has been called var. *integrata* of *L. scariola*, and the author of this paper considers this the best diposition to

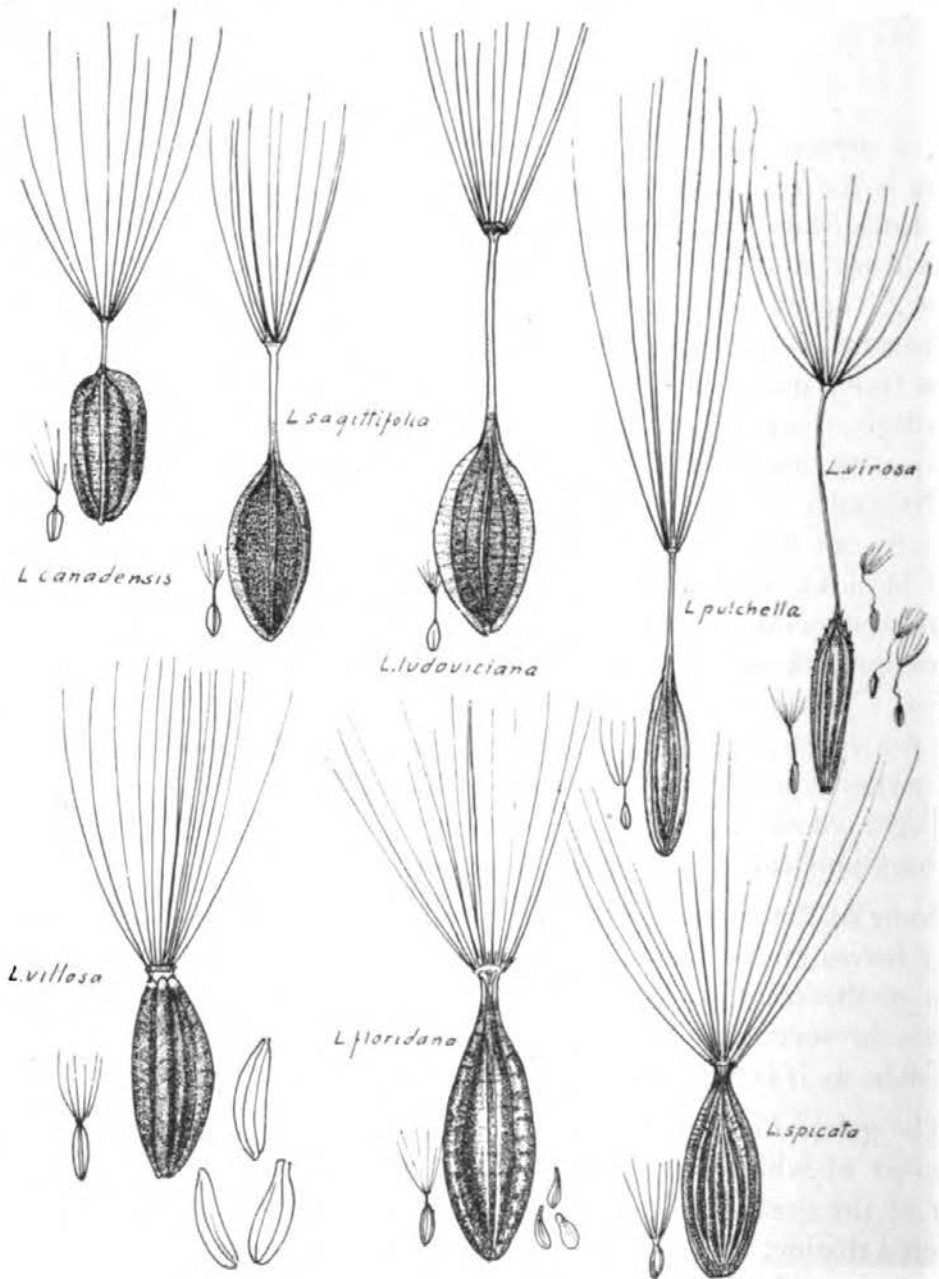


FIG. 83.—Akenes of *Lactuca*.

make of the plant. In the second edition of the *Illustrated Flora*, *L. scariola* is reduced to a synonym of the older Linnaean species. However, in this paper *L. scariola* is retained as a distinct species, although it might well be considered as only a variety of *villosa*.

The leaf-forms of the two plants are strikingly different and appear very uniform throughout our range. *L. virosa* appeared in Iowa some ten years previous to *L. scariola*, but the latter is rapidly supplanting it, especially in the central and southern portions of the state, and threatens to become one of our most persistent weeds. *L. virosa* seems to prefer drier conditions, and is the prevailing form in the arid regions of the west.

The common garden lettuce *L. sativa* L. which, at least in our region, does not possess sufficient vitality to exist without cultivation, is not included in this list. It is very closely related to *L. virosa* and by some is thought to be derived from that species.

All the species contain an acrid juice which probably accounts for their seldom being eaten by stock. The dried milky juice of several old world species, especially *L. virosa*, is a mild anodyne or narcotic, and has frequently been used in medicine, under the name *Lactucarium*.

The genus *Lactuca* may be characterized as follows: Leafy herbs, two to ten feet tall, with rather open, paniced heads of yellow, white, blue or violet flowers, and variously formed alternate leaves; bracts disposed in two or more rows, the successive inner ones longer. Akenes flat or somewhat thickened, contracted at the summit into a long slender beak, or in the third section decidedly contracted at the summit, or beakless in *L. villosa*; the dilated summit of the beak or neck bearing a copious pappus of soft capillary bristles, which are white, except in one of our species; heads six to thirty flowered; receptacle flat and naked.

The name *Lactuca* is from the Latin *Lac*, milk, in allusion to the milky juice.

The species, which number about one hundred, are most numerous in the old world. Besides those here listed five others occur in the Atlantic coast states, one of which, *L. saligna*, is a recent introduction from Europe, and two other species have been described from the Rocky Mountain region.

Key to the Species.

- 1 Section, *Scariola* D. C. Akenes flat, orbicular to linear-oblong, with filiform beak, cauline leaves sagittate-clasping, annual or biennial.

Heads 6 to 12 flowered, akenes linear-oblong, several nerved, flowers yellow.

Leaves mostly entire, midrib usually prickly-

- Leaves pinnatifid, spinulose-denticulate.....*L. scariosa*
 Heads 12 to 20 flowered, akenes oval to oval-oblong, blackish,
 1 nerved on each face with narrow margins.
 Tall, 4 to 10 feet high, leaves 4 to 15 inches long,
 sinuate, pinnatifid, flowers pale yellow.....*L. canadensis*
 Leaves thickish, strictly entire.....*L. sagittifolia*
 Stem more uniformly leafy, basal bracts somewhat
 foliaceous, lobes of leaves spinulose-toothed, flow-
 ers in our plant light purple.....*L. ludoviciana*
 2 Section, *Lactucastrum*, A. Gray, Akenes flat, marginless,
 beak slender, pappus white, perennial.....*L. pulchella*
 3 Section, *Mulgedium* (Cass) A. Gray. Akenes thickish, oblong;
 beak or neck almost wanting, annual or biennial; flowers mostly
 blue.
 Pappus white, akenes beakless, curved.....*L. villosa*
 Pappus tawny, neck short.....*L. spicata*

1. *Lactuca virosa* L. SP. PLANT, 795. (1753.)

L. scariola integrata Auct. An. *L. integrata* Aven Nelson.
 Prickly Lettuce.

Green and glaucous, stems paniculate branched, two to six feet high, scabrous or hirsute at base; leaves mostly entire with spinulose denticulate margins, the midrib usually spiny; margins of the leaves more frequently retaining a horizontal position than the following. Bases sessile or auriculate-clasping, the lower frequently six to ten inches long and two to three inches wide. Heads four to six lines high and two to four lines broad, six to twelve flowered, very numerous, the outer bracts shorter, rays yellow; akenes linear-oblong, or ovate-oblong, somewhat shorter than the wavy, filiform beak; pappus copious, white. This plant is reported to be poisonous to young geese, and Mr. Fred Fitzpatrick of Iowa City says that young goslings pasture on it in preference to any other plant and that he once deliberately experimented by allowing a number of goslings to feed on it, all of which died as a result. This, like the following, being an annual, may be easily controlled by not allowing it to ripen seed, but the laws regarding the mowing of weeds must be more rigidly enforced if these pests are to be kept in subjection. The seeds have mostly been introduced as impurities in clover, millet and heavier grass seeds. Doctor Pammel in his Weed Flora, pp. 396-399, gives illustrations and interesting notes regarding this and the following species, and in Rhodora for October, 1918, p. 180, is an article from his pen giving additional information re-

garding their distribution and frequency. He also states that hybrids between this and the common garden lettuce have been reported.

This species was introduced into Iowa about ten years earlier than *L. scariola*, but throughout the central and southern parts of the state the latter seems to be getting the stronger foothold. *L. virosa* is the prevailing form in the arid regions of the west, its foliage being better calculated to resist the arid conditions.

Specimens examined:

Iowa: Ames, *Pammel*, 1897, 1904, 1911, 1912, 1913; *Campbell*, 1909, 3 sheets; *Ellis*, 1914; *McKinney*, 1916; *Harlan*; *Okoboji*, *Cratty*, 1901; Burlington, *Pammel*, 1918; Council Bluffs, *Pammel*, 1918; Des Moines, *Bakke*, 1912; *Pammel*, 1894, 2 sheets; Eddyville, *Pammel*, 1912; Decatur County, *Anderson*, 1914; Eagle Grove, *Pammel*, 1894; Marshalltown, *Pammel*, 1902; Winneshiek County, *Goddard*, 1895; Herbarium, *T. J. Fitzpatrick*, Henry County, 1895. Van Buren County, 1896, Dubuque County, 1895, Fremont County, 1898, Taylor County, 1898, Johnson County, 1896; Herb. Iowa State University, Coll. *B. Shimek*, Hamburg, 1898, Jackson County, 1894, Keokuk, 1895, Forest City, 1895, Dallas County, 1897, Rock Rapids, 1896, Davenport, 1895, Spirit Lake, 1896, Clear Lake, 1896; Jasper County, *Miss Cavanaugh*, 1898; Muscatine, *Ferd. Reppert*, 1896; Kossuth, *Cratty*, 1896; Goldfield, *Cratty*, 1896; West Bend, *Cratty*, 1919; Madison County, *Pammel*, 1919.

North America: Michigan—Dearborn, *Stewart*, 1898. Illinois—LaSalle, *Pammel*, 1918; Champaign, *Fink*, 1892; Urbana, *Trelease*, 1916. Wisconsin—Madison, *Allen*, 1914, 4 sheets; *Churchill*, 1893: "Wisconsin" Herb. *Parry*. Ohio—Mansfield, *Wilkinson*, 1896. Missouri—Kansas City, *Pammel*, 1918. Montana—Billings, *Pammel*, 1904, 2 sheets. Colorado—Greeley, *Pammel*, 1901; La Porte *Pammel & Johnson*, 1901; College Farm, 1898. Utah—Logan, *Isabel Mulford*, 1896. Washington—Seattle, *Pammel*, 1906.

2. *Lactuca scariola* L. sp. Pl. Ed. 2, 1119 (1763), Prickly Lettuce.

Similar to the preceding species in flowers and fruit, but leaves pinnatifid, with spinulose-denticulate margins, one edge of the leaf usually inclined upwards. Although given specific rank here it might possibly be better considered as a variety of the former. Although appearing in the state some years later than *L. virosa* it is spreading very rapidly and promises to be the most troublesome of the two.

Specimens examined:

Iowa: Harlan, *Pammel*, 1916; Frazer, *Hayden* and *Henderson*, 1916; Ames, *Pammel*, 1916; Sioux City, *Mrs. Taylor*, 1916; Fairmont, *Mrs. Tuttle*, 1918; Burlington, *Pammel*, 1918; Goldfield, *Cratty*, 1919; West Bend, *Cratty*, 1919; Avoca, *Pammel*, 1919.

North America: *Ohio*—Gambier, *Pammel*, 1918. *Illinois*—Urbana, *Trelease*, 1916, 2 sheets; Chicago, *Pammel*, 1887. *Minnesota*—Black Duck, *Mrs. Westley*, 1918. *Nebraska*—Hastings, *Pammel*, 1895. *Colorado*—Golden, *Pammel*, 1895, altitude 8,000 feet. *Dist. of Col.*—Washington, *Dewey*, 1895.

3. *Lactuca canadensis* L. Sp. Plant, 796 (1753). Wild or Tall Lettuce; Wild Opium.

Glabrous and somewhat glaucous throughout, three to ten feet high, leafy up to the narrow branched panicle. Leaves mostly sinuate-pinnatifid, the upper lanceolate and entire; stem leaves clasping, the lower sometimes ten to twelve inches long and narrowed into a petiole. Flowers yellow, numerous, the heads four to seven lines high. Akenes oval, flat, about as long as the beak, and having a distinct margin and strongly one-nerved on each face. A most variable species, especially in its leaf forms.

Open places in moist soil from Nova Scotia to the Northwest Territory and south to Georgia, Louisiana and Colorado. Common throughout Iowa, but not especially troublesome.

Specimens examined:

Iowa: Ames, *Pammel*, 1911, 2 sheets; E. D. *McKune*, 1916, 2 sheets; Burlington, *Pammel*, 1917; Fairmont, *Mrs. Tuttle*, 1918; Clear Lake, *Cratty*, 1918; McGregor, *Pammel*, 1918; Decorah, *Goddard*, 1895, 2 sheets; Des Moines, *Carver*, 1895; *Pammel*, 1902; *Bakke*, 1912; *McKune*, 1916, 2 sheets; Keokuk, *Rolfs*, 1891; Ogden, *Pammel*, 1898; Boone, *Ellis*, 1914; Armstrong, *Cratty*, 1897; Mason City, *Pammel*, 1902; Fayette, *Fink*, 1896; Adel, C. F. *Clark*, 1907; Decatur, *Anderson*, 1914; Postville, *Pammel*, 1918; Frazer, *Pammel*, 1916; Salem, *Jaques*; Kelly, *Miss Clayton*, 1911; Johnson County, *Fitzpatrick*, 1904 and 1905; Jefferson County, *Fitzpatrick*, 1900; Winneshiek County, *Goddard*, 1895; Decatur County, *Fitzpatrick*, 1898; Jackson County, *Shimek*, 1894; Lee County, *Paul Bartsch*, 1895; Greene, *Pammel*, 1919; Madison County, *Pammel*, 1919.

North America: *Illinois*—Walnut, *Pammel*, 1918. *Minnesota*—Black Duck, *Mrs. Westley*, 1918; Anoka, *Cratty*, 1918; Cass Lake, *Pammel*, 1914. *Missouri*—Kansas City, *Pammel*, 1918; St. Louis, *Greenman*, 1916. *Wisconsin*—Prescott, *Miss Edgar*, 1915; "Wis-

consin" *Herb. Parry*; Madison, *Allen*, 7 sheets; Onalaska, *Pammel*, 1917. *Utah*—Logan Canon, *Pammel*, 1908. *Colorado*—Soldier Canon, elevation 6,500 feet, 1898.

4. *Lactuca sagittifolia* Ell. Bot. S. C. & Ga. 2 : 253 (1821-24) Arrow-leaved Lettuce.

Very leafy up to the branched inflorescence; two to six feet high, glabrous throughout; leaves entire, thickish, lanceolate to broadly oblong, the broad amplexicaul auricles of the sagittate base slightly toothed, the basal leaves sometimes petioled. Heads five to seven lines high, rays yellow or reddish; akenes oval, flat, longer than the filiform beak.

The plant ranges from New Brunswick and Ontario to Georgia, Missouri and Idaho. All Iowa specimens seen are from the southern portion of the state. Frequent locally in rich soil.

Specimens examined:

Iowa: Ogden, *Pammel*, 1898; Decatur County, *Anderson*, 1904; Des Moines, *McKune*, 1916; Mt. Pleasant, *Jaques*, 1917; Hopkinton, *Macbride*; Appanoose, *Fitzpatrick*, 1902; Taylor County, *Fitzpatrick*, 1898; Ringgold County, *Fitzpatrick*, 1898; Decatur County, *Fitzpatrick*, 1896.

North America: *Illinois*—Morris, *Pammel*, 1918; Urbana, *Trelease*, 1916. *Missouri*—St. Louis, *Greeneman*, 1916, 2 sheets. *Wisconsin*—Madison, *C. A. Davis*, 1916. *Minnesota*—Duluth, *Pammel*.

5. *Lactuca ludoviciana* (Nutt) D. C. Prod. 7 : 141 (1838). Western Lettuce.

Lactuca campestris Greene is probably only a color form of this species. Biennial, glabrous throughout up to the branched, paniculate inflorescence; two to five feet high, with stem stout, leaves sinuate-pinnatifid, the lobes spinulose toothed. Heads large, eight to ten lines high, the flowers not so numerous as in the two preceding species. Bracts glabrous, the lower ones ovate. Akenes oval to obovate, flat, about equaling the beak; rays pink or light purple so far as observed in Iowa; the flowers seldom opening except early in the morning or on cloudy days; a very variable species. This plant is a good example of color variation in the flowers. The color given in the manuals is yellow, but forms with blue flowers occur in Colorado according to Dr. N. L. Britton. The range is from Minnesota and Illinois to Montana, Colorado and Texas.

Specimens examined:

Iowa: Ames, *Miss Marie Rees*, 1918; *Pammel and Maxwell*, 1911; *W. S. Dudgeon*, 1904, 2 sheets; *S. W. Beyer*, 1888; *Rolfs*, 1897, 2 sheets; *D. C. McKune*, 1916; *Cratty*, 1918; *Kelly*, *Pearl Clayton*, 1911, 3 sheets; *Pammel and Maxwell*, 1911; *Frazer*, *Pammel*; *Ogden*, *Pammel*, 1898; *Slater*, *Rembrandt and Fawcett*, 1902; *High Lake*, *Emmet County*, *Shimek*, 1895; *Winnebago County*, *Shimek*, 1895; *Emmet County*, *Wolden*, 1916; *Des Moines*, *McKune*, 1916; *Salem*, *Pammel*, 1917, 2 sheets; *Arnold's Park*, *Pammel*, 1913; *West Bend*, *Cratty*, 1919.

North America: *Illinois*—*Pullman*, *Pammel*, probably introduced. *Wisconsin*—*Madison*, *Pammel*, 1913; *LaCrosse*, *Pammel*, 1889. *Kansas*—*Wichita*, *Dr. Andrews*, 2 sheets. *South Dakota*—*Watertown*, *Pammel*, 1918.

6. *Lactuca pulchella* (Pursh) D. C. Prod. 7 : 134 (1838) Large Flowered Blue Lettuce.

Perennial, glabrous throughout, and somewhat pale and glaucous, two to four feet high; leaves sessile, oblong or linear-lanceolate, entire or the lower runcinate-pinnatifid. Heads few and large, eight to ten lines high, the outer successively shorter, and ovate-lanceolate. Akenes oblong-lanceolate and nearly twice as long as their beaks.

Frequent in moist soil, having the widest range of any native American species; Ontario to British Columbia and south to Michigan, Kansas, New Mexico and California. It is quite rare as a native of Iowa, but is becoming quite commonly introduced throughout the state as an impurity in timothy seed. Being a perennial it is less easily eradicated than most of the other species, and is reported to be a pernicious weed in some sections. Its handsome blue flowers make it our most beautiful species of the genus.

Specimens examined:

Iowa: *Fremont County*, *Fitzpatrick*, 1898; *Boone*, *Geo. Carver*, 1890; *Sioux City*, *Pammel*, 1895, 2 sheets; *Armstrong*, *Cratty*, 1901, 2 sheets; *Turin*, *Pammel*, 1904; *Wallingford*, *Wolden*, 1916; *Mount Pleasant*, *Mills*; *Osceola County*, *Fitzpatrick*, 1904; *Montgomery County*, *Fitzpatrick*, 1898; *Fremont County*, *Fitzpatrick*, 1898; *O'Brien County*, *Jordan*, 1919; *Arcadia*, *Pammel*, 1919; *Paullina*, *Yockey*, 1919; *Primghar*, *Bernsten*, 1919.

North America: *Minnesota*—*Star Island*, *Cass County*, *Pammel*, 1914; *International Falls*, *Kellogg*, 1914. *South Dakota*—*Brookings*, *Pammel*, 1918; *Spear Fish Canon*, *Miss King*. *North Dakota*—*Sheldon*, 1889. *Nebraska*—*McCook*, *Pammel*, 1895; *Callaway*,

Bates, 1901. *Montana*—Miles City, *Pammel*, 1904. *Wyoming*—Halleck Canon, *Aven Nelson*, 1900; Sheridan, *Reppert* and *Estella Paddock*. *Colorado*—Fort Collins, *Pammel*, 2 sheets; Colorado Springs, *Pammel*, 1895; Greeley, *Pammel*, 1896; Clear Creek, *Herb. Parry*. *Utah*—Peterson, *Pammel* and *Blackwood*, 1902. *Arizona*—Walnut Canon, *McDougal*, 1898.

7. *Lactuca villosa* Jacq., Hort. Schoen, 3 : 62, plate 367 (1798).

L. acuminata A. Gray., Proc. Am. Acad. 19 : 73 (1883). *Mulgedium acuminatum* D. C., Prod. 7 : 249 (1838). Hairy-veined Blue Lettuce.

A glabrous stemmed annual or biennial which is leafy up to the paniculate inflorescence; four to seven feet high, heads numerous on diverging peduncles. Leaves oblong to lanceolate, sharply and sometimes doubly serrate. The lower often deeply lobed or runcinate, glabrous above, pubescent with short stiff hairs on the veins beneath, slightly clasping at the base, four to six inches long and one-third as wide. Rays blue, involucre about five lines high, the outer bracts much shorter and mostly obtuse. Akenes narrowly oblong, slightly curved and flattened, narrowed at the summit and almost beakless; pappus white. Borders of woods, New York to Iowa, and south to Florida and Kentucky. Abundant, especially in the eastern and southern parts of the state.

This species has been confounded with the southeastern *L. floridana* (L.) Gaertn, with which it is almost identical in foliage. The latter species probably does not occur in this region, although credited to it in our manuals, and in all the herbaria examined. In every case where so labelled the fruit has proved to be typical of *L. villosa*. In the first edition of the *Illustrated Flora*, vol. III, p. 275, the figure of the akene given on the cut of *L. floridana* is identical with that of *L. villosa* on the same page, but in the second edition the error is somewhat remedied by removing the figure of the akene from the cut of the former. A good figure of the akene of *L. floridana* is given in Gray's Manual, 7th edition, p. 688, and for the benefit of those interested in this species a figure of the akene from an authentic specimen (Curtis's No. 5763, collected at Jacksonville, Florida, in 1896) is given on the plate which accompanies this paper. A specimen listed below, labelled *L. floridana*, and collected by Webber in Nebraska in 1886 is in the herbarium of the Field Columbian Museum, Chicago, but it proves to be *L. pulchella*, and is presumably the same plant on which Webber admitted *L. floridana* into his flora of Nebraska. The heads of the latter species are a third

larger than those of *L. villosa*, the bracts with tapering points; the most striking difference, however, is in the shape of the akenes.

Specimens examined:

Iowa: Ames, *Ball*, 1897; *Pammel*, 1910; Keosauqua, *McDonald*, 1907; Des Moines, *Carver*, 1895; Decatur County, *Anderson*, 1904; Lee County, *Bartsch*, 1895; Des Moines County, *Fitzpatrick*, 1896; Decatur County, *Fitzpatrick*, 1897 and 1898; Johnson County, *Fitzpatrick*, 1894, 1896, 1900; Van Buren County, *Fitzpatrick*, 1896; Council Bluffs, *Miss Cavanaugh*, 1898; Mount Pleasant, *Mills*; Des Moines County, *Bartsch*, 1895; Jackson County, *Shimek*, 1894; Iowa City, *Somes*, 2 sheets; Madison County, *Pammel*, 1919.

North America: *Missouri*—Allenton, *Letterman*, 2 sheets; St. Louis, *Greeneman*. *Illinois*—Urbana, *Trelease*, 2 sheets. *Wisconsin*—Prescott, *Miss Edgar*. *Nebraska*—Cass County.

8. *Lactuca spicata* (Lam.) Hitch., St. Louis Acad. Sci. 5:506 (1891), *L. leucophæa* A. Gray., Prod. Am. Acad. 19:73 non *Sibthorp* (1840). *Mulgedium leucophocum* D. C., Prod. 7:250 (1838). Tall Blue Lettuce.

A stout stemmed annual or biennial, leafy up to the rather dense panicle. Leaves irregularly pinnatifid or runcinate, coarsely toothed, the upper stem leaves sessile or auriculate clasping. Flowers bluish or cream color. Akenes short beaked, the copious pappus tawny.

Common, Maine to Minnesota and Alaska, south to North Carolina and Tennessee. Infrequent in Iowa in moist soil.

Specimens examined:

Iowa: Fayette, *C. C. Parker*; Winneshiek County, *Goddard*, 2 sheets; Des Moines, *Paul Bartsch*.

North America: *Illinois*—Urbana, *Trelease*, 1916. *Wisconsin*, *Allen*, 2 sheets. *Minnesota*—Hennepin County, *Burglehaus*, 1891; Coleraine, *Cratty*, 1919. *Kentucky*—Bell County, *T. H. Kearney, Jr.*, 1893. *Michigan*—Mackinac Island, very common and the only species observed, *Cratty*, 1919. *Alaska*—Haines, *J. P. Anderson*, Plants of Alaska, No. 890, Aug. 21, 1918.

HERBARIUM IOWA STATE COLLEGE.